

Urban Biodiversity in the Holmes Run/Cameron Run Watershed



Urban Biodiversity in the Holmes Run/Cameron Run Watershed

Landscape Assessment & Biodiversity Planning Considerations



Principal Authors:

Margaret Bryant
Bernice Smith

John Randolph
Moonsun Jeong
Monica Lipscomb

Landscape Assessment & Biodiversity Planning Considerations

Data Collection and Mapping:

Moonsun Jeong
Watsun Randolph



Prepared by the
Departments of Landscape Architecture and
Urban Affairs and Planning
Virginia Polytechnic Institute & State University

for the
Urban Biodiversity Information Node Pilot (UrBIN) of the
National Biological Information Infrastructure



March 2003

Table of Contents

LIST OF FIGURES	vi
ACKNOWLEDGEMENTS	vii
INTRODUCTION	1
PART 1 BIODIVERSITY IN AN URBAN WATERSHED	
1.1 What is Urban Biodiversity?	3
1.1.1 The Emerging Science of Urban Biodiversity	4
1.1.2 Urban Long-Term Ecological Research Program	4
1.1.3 Landscape Ecology	5
1.2 Watershed Description	5
1.3 Historical Overview	7
1.4 Chesapeake Bay Regulations	10
PART 2 LANDSCAPE ASSESSMENT	
2.1 Landform, Soils, and Climate	13
2.3 Wetlands	16
2.4 Floodplains	16
2.5 Surface and Groundwater	17
2.5.1 Overview of Water Quality Standards	17
2.5.2 Measurements in Holmes Run/Cameron Run	18
2.5.3 Lake Barcroft	21
2.5.4 Groundwater Resources	22
2.6 Natural Communities	23
2.6.1 Land Cover	23
2.6.2 Flora	25
2.6.2.1 The 1974 Survey	26
2.6.2.2 The 2001 Cameron Run Survey	26

2.6.2.3 Submerged Aquatic Vegetation	28
2.6.3 Fauna	28
 2.7 Land Use and Open Space	 30
2.7.1 Population, Land Use, and Parkland	31
2.7.2 Transportation	36
 2.8 Implications for Urban Biodiversity	 37

PART 3 BIODIVERSITY PLANNING ISSUES

3.1 Habitat Loss	41
3.1.1 Stream Quality and Biodiversity	41
3.1.1.1 Potential Sources of Environmental Pollution.	42
3.1.1.2 Impervious Surfaces	43
3.1.1.3 Flooding and Flood Control	44
3.1.1.4 Riparian Forest Buffer Systems	45
3.1.2 Upland Habitats	47
3.1.3 Invasives Management	47
 3.2 Conservation Strategies	 49
3.2.1 Compliance with Chesapeake Bay Regulations	49
3.2.1.1 Fairfax County	49
3.2.1.2 City of Alexandria	49
3.2.1.3 City of Falls Church	51
3.2.2 Other Local Government Policies Affecting Biodiversity	52
3.2.2.1 Fairfax County	52
3.2.2.2 City of Alexandria	55
3.2.2.3 City of Falls Church	56
3.2.2.4 Environmental Coordination	57
 3.3 Conservation Easements	 58

PART 4 CONCLUDING COMMENTS

4.1 The Nature of Urban Biodiversity	61
4.1.1 The Highly-Urbanized Case	61
4.1.2 Invasive and Native Species	61
 4.2 Data for Assessment of Urban Biodiversity	 62
4.2.1 Limitations in Timing and Availability of Data	62
4.2.2 Scale of Analysis	63
 4.3 Planning and Managing Urban Biodiversity	 63

4.3.1 Watershed Education and Protection	64
4.3.2 Floodplain Management and Riparian Restoration	64
4.3.3 Urban Forestry	64
4.3.4 Park and Open Space Acquisition and Management	65
4.3.5 Development, Redevelopment, and Conservation Design	65
4.3.6 Habitat Conservation, Wildlife, and Exotic Species Management	65
4.3.7 Stakeholder Involvement	66

List of Figures

FIGURE 1.	THE MIDDLE POTOMAC-ANACOSTIA-OCOQUAN BASIN	6
FIGURE 2.	POLITICAL AND WATERSHED BOUNDARIES	7
FIGURE 3.	STREAMS, WATERBODIES, AND RESOURCE PROTECTION AREAS	8
FIGURE 4.	MAJOR TRANSPORTATION ROUTES	9
FIGURE 5.	CHESAPEAKE BAY WATERSHED	11
FIGURE 6.	PHYSIOGRAPHY	13
FIGURE 7.	ELEVATION	14
FIGURE 8.	SLOPE STEEPNESS	15
FIGURE 9.	WATER MONITORING SITES	19
FIGURE 10.	IMPERVIOUS SURFACES	20
FIGURE 11.	METROPOLITAN WASHINGTON, D.C. LAND COVER	23
FIGURE 12.	LAND COVER IN THE HOLMES RUN/CAMERON RUN WATERSHED	24
FIGURE 13.	FALLS CHURCH LAND COVER	25
FIGURE 14.	POPULATION CHARACTERISTICS	31
FIGURE 15.	LAND USE	32
FIGURE 16.	LAND USE PERCENTAGES	33
FIGURE 17.	INFILL AND POTENTIAL REDEVELOPMENT SITES	33
FIGURE 18.	PARKLAND	35
FIGURE 19.	BICYCLE AND PEDESTRIAN TRAILS	36
FIGURE 20.	FOREST COVER AND PROTECTED LANDS	38
FIGURE 21.	ROAD DENSITY	39
FIGURE 22.	FOREST PATCHES WITH POTENTIAL INTERIOR HABITATS	40
FIGURE 23.	INFILL DEVELOPMENT IN ALEXANDRIA	43
FIGURE 24.	SCHUELER'S SIMPLE MODEL	44
FIGURE 25.	FLOODPLAIN DEVELOPMENT IN HOLMES RUN JUST UPSTREAM FROM LAKE BARCROFT	45
FIGURE 26.	RIPARIAN BUFFER IN LOWER CAMERON RUN	46
FIGURE 27.	BAMBOO UNDERSTORY IN HOLMES RUN FLOODPLAIN	47
FIGURE 28.	FAIRFAX COUNTY'S STREAM VALLEY ENVIRONMENTAL QUALITY CORRIDOR	54

Acknowledgements

The Virginia Tech landscape characterization and spatial analysis team wishes to thank the many individuals who contributed to the development of this report. Their genuine interest in

enhancing our understanding of the Holmes Run/Cameron Run watershed is greatly appreciated. Special thanks goes to Todd Bolton of the Fairfax County Park Authority, Noel Kaplan of the Fairfax County Planning and Zoning Department, Bill Hicks of the City of Alexandria Watershed Program, Matt Myers of the Fairfax County Stormwater Planning Division, and Helen Reinecke-Wilt of the City of Falls Church Planning Division who took time out of their busy schedules to make informal presentations and provide government documents. Stuart Finley of the Lake Barcroft Watershed Improvement District, Alex Lee, Assistant Project Coordinator of the Woodrow Wilson Bridge Project, and Jennifer Sunley, Environmental Specialist with the Woodrow Wilson Bridge Project, answered questions and shared previous studies and reports on the watershed. On behalf of the UrBIN project team, we extend our sincere appreciation for their patience and availability for follow-up questions.

Thanks to Kathleen Bennett and Bryant Thomas, State Department of Environmental Quality; David Bulova, Northern Virginia Regional Commission; Becky Keenan, City of Falls Church Animal Warden; Nancy Moncrief, Ph.D., Virginia Museum of Natural History; and Francine Bromberg, City of Alexandria Archeologist for sharing their knowledge and in some cases providing referrals to other experts. The input of such local experts is an essential part of the collaborative effort needed to understand biodiversity issues in the watershed.

Several graduate students worked to synthesize the essential findings of a large stack of reports previously written on the Holmes Run/Cameron Run watershed. In particular, Bernice Smith wrote the first draft of this report. Her perseverance in collecting such a wide range of information and compiling it in a readable form is greatly appreciated. Bernice was assisted in her effort by reports written by two other graduate students, Monica Lipscomb and Moonsun Jeong. Moonsun Jeong, assisted by Watsun Randolph, was also responsible for nearly all of the GIS analyses. Moonsun and Watsun left no stone unturned in pursuit of data and spatial analyses applicable to this study. Thank you for your hard work!